

AMENDMENTS TO THE CLAIMS

1. (**Currently Amended**) A chemically bonded biomaterial element ~~composed of~~ comprising an inorganic cement, exhibiting minimal dimensional changes upon hardening and long-time use, improved mechanical properties and improved translucency, ~~characterised in~~ wherein:

the biomaterial element has a micro-structure to meet an algorithm to describe the micro-structure, which is expressed as defined by a formula:

$$\lambda = \frac{d * (1 - V_f)}{(V_f)}$$

where λ is the distance between filler particles of mean size d , and V_f is the volume content of non-reacted cement and added filler, and where $\lambda \leq 10 \mu\text{m}$, and
wherein added inert filler particles have a particle size below $5 \mu\text{m}$, and
wherein the inert filler particles consist of glass particles, apatites, brucite and/or bohmite.

2. (**Currently Amended**) A The biomaterial element according to claim 1, ~~characterised~~ in that wherein $\lambda \leq 8 \mu\text{m}$, ~~even more preferred $\lambda \leq 4 \mu\text{m}$ and most preferred $\lambda \leq 2 \mu\text{m}$.~~

3. (**Currently Amended**) A The biomaterial element according to claim 1, ~~characterised~~ in that wherein V_f is less than 50 %, ~~preferably 5-45 % and even more preferred 15-35 %.~~

4. (**Currently Amended**) A The biomaterial element according to claim 1, ~~characterised~~ in that wherein it exerts a pressure or tensile force of $< 5 \text{ MPa}$ [[,]] ~~even more preferred $< 2 \text{ MPa}$ and even more preferred $< 1 \text{ MPa}$, on a surrounding volume.~~

5. (**Currently Amended**) A The biomaterial element according to claim 1, ~~characterised~~ in that wherein

the inorganic cement phase is composed of comprises Ca-aluminate, ~~and/or~~ Casilicate ~~and/or or~~ Ca-phosphate, or a mixture thereof.

6. **(Currently Amended)** A biomaterial element according to claim 1, ~~characterised in that wherein~~

~~the inorganic cement phase is composed of phases in the $\text{CaO}-\text{Al}_2\text{O}_3$ comprises $\text{CaO}-\text{Al}_2\text{O}_3$ system, i. e. CaO , $(\text{CaO})_3\text{Al}_2\text{O}_3$, $(\text{CaO})_{12}(\text{Al}_2\text{O}_3)_{25}$, CaOAl_2O_3 , $(\text{CaO})(\text{Al}_2\text{O}_3)_{25}$, $(\text{CaO})(\text{Al}_2\text{O}_3)_6$ and/or pure Al_2O_3 with varying relative contents, where the preferred main phases are CaOAl_2O_3 and $(\text{CaO})(\text{Al}_2\text{O}_3)_2$ and the most preferred main phase is CaOAl_2O_3 and~~

~~a particle size of formed hydrates of these phases being is below $3\text{ }\mu\text{m}$, even more preferred below $1\text{ }\mu\text{m}$ and most preferred below $0.5\text{ }\mu\text{m}$.~~

7. **(Currently Amended)** ~~A~~ The biomaterial element according to claim 1, ~~characterised in that wherein the biomaterial element it also further~~ comprises an organic phase of preferably polyacrylates and/or polycarbonates ~~and preferably~~ at a volume content of $[[<]]$ less than 5 %.

8-9. **(Cancelled)**

10. **(Currently Amended)** ~~A~~ The biomaterial element according to claim 1, ~~characterised in that wherein~~ it comprises in-situ formed apatite ~~or some other phase that separates the formed hydrates of the main system.~~

11. **(Currently Amended)** ~~A~~ The biomaterial element according to claim 1, ~~characterised in that wherein~~ a total porosity is below 10 %, ~~even more preferred below 5 %, distributed on where at least 90% of the pores are~~ minipores having a diameter below $0.5\text{ }\mu\text{m}$, ~~even more preferred below $0.1\text{ }\mu\text{m}$, to an extent of at least 90 % of the total porosity.~~

12. **(Currently Amended)** ~~A~~ The biomaterial element according to claim 1, ~~characterised in that wherein~~ it is a dental material, preferably a dental filling material or a root filling material.

13. **(Currently Amended)** A The biomaterial element according to claim 1, ~~characterised in that wherein the biomaterial element contains~~ it is an orthopaedic material or a bone cement.

14. **(Currently Amended)** A The biomaterial element according to claim 1, ~~characterised in that wherein~~ it is a component, or is in granule form, ~~preferably as or in~~ a carrier material for drug delivery.

15. **(Cancelled)**

16. **(New)** The biomaterial element according to claim 1, wherein $\lambda \leq 4 \mu\text{m}$.

17. **(New)** The biomaterial element according to claim 1, wherein $\lambda \leq 2 \mu\text{m}$.

18. **(New)** The biomaterial element according to claim 1, wherein V_F is 5-45 %.

19. **(New)** The biomaterial element according to claim 1, wherein V_F is 15-35 %.

20. **(New)** The biomaterial element according to claim 1, wherein it exerts a pressure or tensile force of $< 2 \text{ MPa}$ on a surrounding volume.

21. **(New)** The biomaterial element according to claim 1, wherein it exerts a pressure or tensile force of $< 1 \text{ MPa}$ on a surrounding volume.

22. **(New)** The biomaterial element according to claim 6, wherein the $\text{CaO-Al}_2\text{O}_3$ system is CaO , $(\text{CaO})_3\text{Al}_2\text{O}_3$, $(\text{CaO})_{12}(\text{Al}_2\text{O}_3)_7$, CaOAl_2O_3 , $(\text{CaO})(\text{Al}_2\text{O}_3)_2$, $(\text{CaO})(\text{Al}_2\text{O}_3)_6$ or pure Al_2O_3 or a mixture thereof.

23. (New) The biomaterial element according to claim 6, wherein a main phase of the CaO-Al₂O₃ system is CaOAl₂O₃ or (CaO)(Al₂O₃)₂.

24. (New) The biomaterial element according to claim 6, wherein a main phase of the CaO-Al₂O₃ system is CaOAl₂O₃.

25. (New) The biomaterial element according to claim 6, wherein a particle size of formed hydrates of these phases is below 1 μm.

26. (New) The biomaterial element according to claim 6, wherein a particle size of formed hydrates of these phases is below 0.5 μm.

27. (New) The biomaterial element according to claim 1, wherein added inert filler particles have a particle size below 2 μm.

28. (New) The biomaterial element according to claim 1, wherein a total porosity is below 5 %, distributed on minipores having a diameter below 0.1 μm, to an extent of at least 90 % of the total porosity.

29. (New) A biomaterial element according to claim 12, wherein the dental material is a dental filling material or a root filling material.